

*With compliments of Dr. J. P. Wall.*

# CLIMATOLOGICAL

AND

## SANITARY REPORT OF FLORIDA.

BY

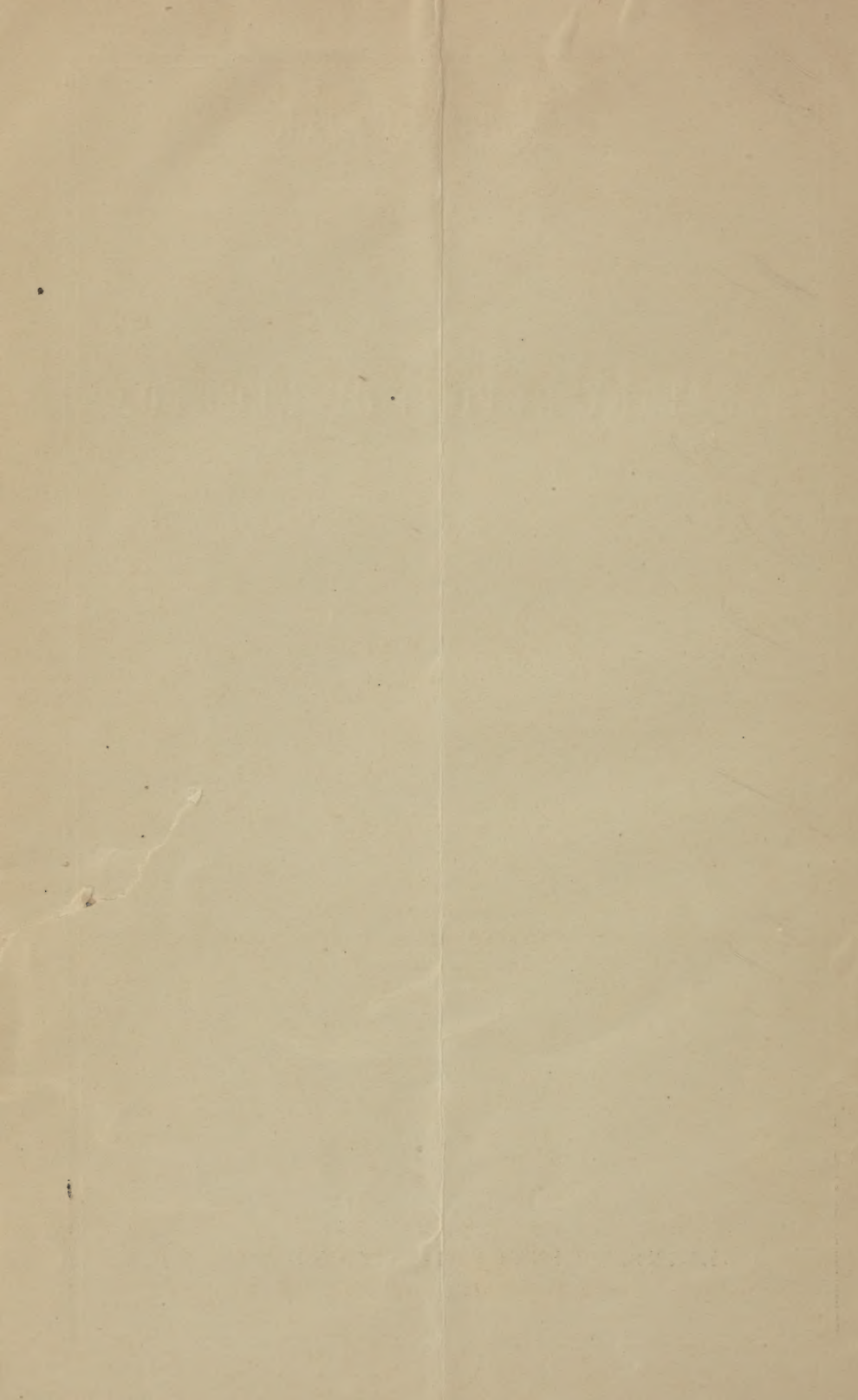
JOHN P. WALL,

OF TAMPA.



EXTRACTED FROM THE  
TRANSACTIONS OF THE AMERICAN MEDICAL ASSOCIATION.

PHILADELPHIA:  
COLLINS, PRINTER, 705 JAYNE STREET.  
1875.



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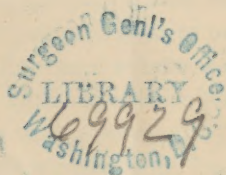
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## CLIMATOLOGICAL AND SANITARY REPORT OF FLORIDA.

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HISTORICAL SKETCH.—From the earliest discovery of Florida in 1497, by Sebastian Cabot, five years after the first voyage of Columbus, up to the present time, she has ever and anon been the object of considerable interest. As early as 1512, Ponce de Leon landed on her shores in search of health, hoping to find in her glades or forests the rejuvenating fountains of "eternal youth." Other Spanish expeditions, for the conquest of Florida, followed, the most noted of which was that under Hernando De Soto in 1539. This bold and chivalric adventurer, with a thousand mail-clad followers, landed at Tampa Bay (*San Espiritu*), and amid the hardships and dangers of penetrating and traversing an unexplored country, inhabited by barbarous and hostile savages, made his way northward beyond the present confines of the State, and thence pursued a westward route to the Mississippi, where his own restless career and that of his ill-starred expedition terminated. His failure to find among the natives the precious metals in abundance, as his compatriots, Pizarro and Cortez, had done in Peru and Mexico, cooled the ardor of the avaricious Spaniards for conquest and domination in the vast territory then claimed as Florida.

The first permanent settlement was made in the sixteenth century, by some French Huguenots, on and near the mouth of the St. John's River. In a few years they were massacred as heretics and foreigners. A similar fate soon overtook the perpetrators of this barbarous deed. In 1565, the Spanish Governor, Menendez, founded St. Augustine; and consequently for antiquity its claims to priority over every other place in the United States are conceded. From this time, Florida became a petty colony of Spain, only attracting a little attention now and then during the continental wars of Europe. From 1713 to 1784, Florida was a British possession,

during which an Englishman, named Turnbull, planted a colony of Minorcans at New Smyrna; but on the recession to Spain, the colony was broken up. In 1819 Spain ceded Florida to the United States, and in 1821 the latter took formal possession.

During all the time of nearly three centuries of Spanish claim and possession, but a few small settlements had been made along the coast, the principal of which was Pensacola. With the decadence of the Spanish power in Europe that of the colonies kept pace, and no efforts appear to have been made either to possess and cultivate the soil or to civilize the aborigines. On the other hand, it seems that her Indian population received some considerable accessions from those of Georgia and Alabama, so that when Florida was ceded to the United States, it is estimated that there were not exceeding six hundred whites in the territory, while occupied by a tolerably dense Indian population throughout. The number of refugee Indians was so great and preponderating, as to attach the name Seminole (*meaning refugee, or runaway*) to the whole of the Florida Indians.

It is highly probable that the Spaniards made some efforts to establish a settlement in the extreme southern part of the peninsula as being nearest and most accessible to Cuba. And there are strong probabilities that they projected and undertook to drain Lake Okechobee, as various completed sections of a canal from the Lake to the Caloosahatchie River are still to be seen. In relation to this there is a legend that they had a penal establishment on an island on the lake, and that it was with convict labor that this effort to drain the lake was made.

In 1845, Florida was admitted into the Union, and thence on, her political history has been that of the other States, and particularly those of the South. From her cession to the United States to within two years of her secession, Florida was the theatre of almost continuous hostilities between the General Government and the Seminole Indians. The latter were easily driven into the peninsula, but here, with Spartan courage and Roman firmness, they resisted alternate coercion and persuasion to go west, and a feeble remnant still remains, evincing the instinctive love of country even in the savage breast. The presence of so large a tribe of Indians, together with their frequent and protracted hostilities, retarded the settlement of the peninsula for nearly forty years. Since the war, the State has attracted considerable attention on account of the mildness of its winter climate, and fruit-growing. But, so far, the



eastern part, because of its greater accessibility, has been the only portion much visited or settled. The whole State is generally judged in both soil and climate by what the tourist experiences and sees along the St. John's, and thus he fails to arrive at anything like a correct estimate of these two important features of the State.

CLIMATOLOGY.—Florida extends from the  $25^{\circ}$  to the  $31^{\circ}$  north latitude, and lies within  $80^{\circ}$  and  $88^{\circ}$  west longitude from Greenwich; thus comprising about six degrees of latitude, and nearly eight degrees of longitude. The State has been likened in shape to a boot, the peninsula constituting the leg, and the continental portion the foot, with the toe to the west. She contains 59,868 square miles, making her territory a little more extensive than Georgia, the "Empire State of the South." The census of 1870 gives her population at 187,748, nearly equally between whites and negroes—the former being a few thousand in the majority. The middle and western divisions of the State, except near the coast, are elevated and generally rolling; and this character of the country extends eastward beyond Lake City to the Little St. Mary's River. The country is also elevated and rolling down the middle, and western slope of the peninsula to the  $28^{\circ}$  of latitude for the latter, and a little further south for the central ridge. From the St. Mary's River on the north, all along the eastern part of the State, the country is low and level beyond the head waters of the St. John's, and thus continues down the peninsula. The entire lower third of the peninsula is low and level, and covered with extensive savannahs, lakes, and everglades. A slightly more elevated ridge near the coast, on each side, is to be found in this latter portion. Florida has no mountains, nor are there any in Georgia and Alabama of sufficient proximity to her borders to exercise any influence on her climate. In comparison with the St. John's, the other rivers wholly within her borders are small; and while the majority, like the St. John's, have their sources in lakes and swamps, others appear to be entirely of subterranean origin. This latter feature is peculiarly characteristic of many short but bold and voluminous rivers along the gulf coast of the peninsula, between the mouth of the Withlachooche and Tampa Bay. Some smaller streams of a similar subterranean origin are to be found on the western side of the St. John's, into which they empty. In the elevated and rolling sections, most of the rain water escapes through subterranean passages found in sink-holes

into which lead one or more large ditch-like ravines with numerous tributaries. The soil is mostly a silicious sand, loose and porous in elevated sections, fine and compact in those low and level. In some localities in Middle and West Florida there is some clay soil.

The absence of parallel geographical and surface conditions, between Florida and countries in the same latitude on the Eastern Continent, occasions greater dissimilarity in climate than might be supposed to exist if only superficially considered. The same thing, likewise, applies to a considerable extent to the climates of the two continents. While the Atlantic States of North America resemble more nearly in winter climate the countries in Eastern Asia than those of Western and Southern Europe, yet there are no exact parallels, and this divergence increases in the lower latitudes; for, although a fall of snow is rare in Canton, yet a parallel phenomenon would be its occurrence in Key West—both places being exactly in the same latitude. The summer temperature is also greater in the United States east of the Rocky Mountains than that in the same latitudes in Europe; and similarity in climates for all seasons is only approximated on the Pacific coast. Nor do the Gulf of Mexico and the Mediterranean afford any parallels as regards the effects of the former on the climate of Florida.

Our consideration of the climate of Florida, then, must be confined to an exposition of such meteorological facts as have been accumulated, with such deductions and inferences as may be legitimately presented. And, in view of the paucity of material within my reach and the importance of the subject, this effort will lead, it is hoped, to a more thorough investigation of the subject by some one with greater abilities and more facilities at command than I possess.

In the first place, it will be observed that Pensacola (Barrancas Barracks) is the only place in Middle and West Florida where meteorological observations have been recorded; and these observations can hardly be taken as fully and fairly representing the interior of these sections whose altitude is much more considerable than that of the coast-line. The situation of Punta Rassa, on the Gulf coast, also, can hardly give a fair criterion of the climatic conditions of the interior of the peninsula. The small size and remote position of the island of Key West, at a considerable distance from the main-land, gives to that station but little importance as bearing on the climate of the State. Under all the circumstances, it is easy



to foresee that this effort must fall far short of both completeness and exactness as representing either the whole State or any of its sections.

The first two of the tables are those of mean temperature and rain-fall for each month, season, and the whole year, as observed at the various military posts in the State for a period of years. The material of the other tables has been supplied by works from the Signal Office for two years, beginning October, 1872, and ending October, 1874. Only for the latter year is the percentage of relative humidity given for each month, etc. My excuse for introducing so many tables is the hope that the presentation of all the meteorological facts as thus tabulated, even only for one year, may not be uninteresting as affording something of an index of the normal climatic conditions of the State.

I.—Table of Mean Temperature for each Month, Season, and the Year; from observations at various points in Florida for a period of years.

STATION.	POSITION OF STATION.			MONTHS.												DATE.	AUTHORITY.						
	Lat.	Long.	Alt. feet.	January.	February.	March.	April.	May.	June.	July.	August.	Sept.	October.	November.	December.			Spring.	Summer.	Autumn.	Winter.	Year.	No. of Yrs and Mos.
St. Augustine . .	29°48'	81°35'	20	57.0	59.9	63.3	68.8	73.5	79.3	80.9	80.5	78.6	71.9	64.1	57.2	68.5	80.3	71.5	58.1	69.6	20	1824-1852	Military Post (Fort Marion).
Jacksonville . .	30 15	82 00	14	56.4	56.1	64.2	67.8	76.4	79.4	82.3	82.4	80.7	68.7	64.1	54.2	69.5	81.4	71.2	55.6	69.4	2	1854-1855	Dr. A. S. Baldwin.
Pilaka . . . .	29 34	81 48	25	57.2	58.3	64.1	71.2	76.6	80.3	81.2	80.2	78.6	70.5	61.5	56.0	70.6	80.6	70.2	57.2	69.6	6	1838-1843	Military Post.
New Smyrna . .	28 54	81 02	10	62.4	63.7	67.6	73.6	74.2	78.8	79.8	78.8	78.2	72.0	67.2	63.5	71.8	79.1	72.4	63.2	71.6	3	1840-42; 1853	"
Fort Pierce . .	27 30	80 20	25	62.7	64.4	69.8	73.6	76.9	79.0	82.5	82.4	80.8	75.0	68.5	62.6	73.4	81.3	74.8	63.3	73.2	5-6	1840-41; 1852-55	"
Fort Dallas . .	25 55	80 20	20	66.4	66.6	70.4	75.6	78.0	80.5	82.1	81.8	79.6	77.9	71.3	66.8	74.7	81.5	76.3	66.6	74.7	4-6	1839-41; 1850-55	"
Key West . . .	24 32	81 48	10	66.7	68.9	72.9	75.4	79.1	81.6	83.0	82.9	81.9	78.1	74.7	71.0	75.8	82.5	78.2	69.5	76.5	14	1831-38; 1843-55	"
Fort Myers . .	26 38	81 00	10	63.4	68.0	72.2	73.8	80.1	81.2	82.9	83.1	81.7	77.7	71.5	64.7	75.4	82.4	77.0	65.3	75.0	4	1851-1854	"
Tampa . . . .	28 00	82 28	20	61.5	63.5	67.7	71.8	76.6	79.5	80.7	80.4	78.3	74.0	66.9	62.0	72.1	80.2	73.1	62.3	71.9	25	1825-1854	"
Fort Meade . .	28 01	82 00	80	58.4	63.2	69.0	69.9	76.7	78.2	79.8	80.0	79.2	73.8	68.5	61.1	71.9	79.3	73.8	60.9	71.5	3-8	May, 1851-1854	"
Micanopy . . .	29 30	82 28	60	60.5	60.5	67.4	72.0	76.6	79.3	80.0	79.3	77.9	70.5	61.0	56.0	72.0	79.6	69.8	58.9	70.1	4-6	July, 1838-1842	"
Fort King (Beala) .	29 10	82 10	50	58.5	58.2	64.3	71.4	76.4	79.8	80.8	80.1	78.2	70.6	63.2	58.5	70.7	80.2	70.6	58.4	70.0	6	1832, irreg. 1843	"
Cedar Keys . .	29 07	83 03	15	55.6	55.3	68.4	68.7	76.9	79.7	81.3	81.4	79.7	72.5	64.3	59.1	71.3	80.8	72.2	57.7	70.2	5	1850-55; ex. 1853	Judge Steel.
Fort Fanning . .	29 35	83 00	50	59.7	58.3	67.0	70.6	75.7	79.1	81.6	82.2	80.4	72.1	60.6	55.0	71.1	81.0	71.1	57.7	70.2	2-3	Oct. 1840-42	Military Post.
Pensacola . . .	30 18	87 27	20	53.6	55.6	61.8	68.5	75.4	80.8	82.3	81.6	78.5	70.1	61.0	55.6	68.6	81.6	69.8	54.9	68.7	17	1822-29; 1842-54	Military Post, irreg.

St. Augustine, New Smyrna, and Fort Dallas are on the Atlantic coast; Jacksonville and Plakka are on the St. John's; Fort Pierce (also called Fort Capron) is on Indian River between the St. John's River and Atlantic. Fort Myers is on the Caloosatchie River, 15 miles from its mouth; Tampa is at the head of Tampa Bay 30 miles from the Gulf; Fort Meade is on Peace Creek, in the interior 46 miles from Tampa; Micanopy is south of Payne's Prairie and 12 miles south from Gainesville; Fort Fanning is on the Suwanee River. The other points are sufficiently well known.

The records, in many instances, not being for the same years at the different points, may mislead as to their comparative temperatures. Only those for the longest periods should be considered as approximating the true mean.

II.—Table of Mean Temperatures for each Year, for two years beginning October, 1872, and ending September, 1874, as observed at the four Signal Stations in Florida.

STATION.	POSITION OF STATION.			feet.	Oct.	Nov.	Dec.	January.	February.	March.	April.	May.	June.	July.	August.	Sept.	Spring.	Summer.	Autumn.	Winter.	Year.
	Lat.	Long.	Alt.																		
Jacksonville.	30°24'	80°40'	14	68.2 65.5 66.9	58.0 53.0 53.0	51.0 55.7 53.3	52.4 54.5 53.5	59.2 58.0 58.6	58.9 65.8 62.3	58.9 69.1 60.1	69.2 69.1 74.8	75.6 74.0 74.8	80.0 80.0 80.0	81.6 79.0 80.3	81.6 81.0 81.3	78.5 77.0 77.7	67.9 69.6 98.7	81.0 80.0 80.5	68.2 66.8 67.5	54.2 56.0 55.1	67.8 68.0 67.9
Lake City	30 13	82 40	200	66.7 64.8	56.1 56.0	49.7 54.1	50.3 52.7	57.6 58.4	67.8 63.7	67.7 67.0	75.2 74.0	77.7 77.0	79.8 78.0	79.8 78.0	78.6 80.0	76.8 77.0	66.9 68.0	78.7 78.3	66.5 65.9	52.5 55.0	66.1 66.8
Punta Rassa.	27 00	82 18	5	75.0 73.0	63.3 64.0	63.5 64.7	62.0 62.7	66.4 58.9	65.2 71.0	72.8 73.8	78.8 79.0	80.6 76.0	80.6 79.0	80.9 80.9	80.5 83.0	81.1 78.0	72.2 73.6	80.6 80.0	74.4 71.6	63.9 65.4	72.7 72.6
Key West	24 32	81 48	10	74.0 78.2 76.0	66.1 73.7 73.0	64.1 69.1 70.5	62.3 69.9 70.5	67.6 72.1 68.0	68.1 71.5 73.0	73.3 76.8 78.0	77.4 82.4 81.0	79.8 83.6 83.0	79.8 83.0	79.9 83.0	81.7 82.5	79.0 84.0	72.9 76.9 78.1	80.3 83.3 83.3	73.0 78.1 76.0	64.6 70.0 70.5	72.6 77.0 75.3
				77.1	73.3	69.8	68.9	72.5	73.4	77.4	81.7	83.3	83.3	83.0	83.7	81.2	77.5	83.3	77.0	70.2	76.1

Note.—In the two tables of temperature there is a slight discrepancy in the latitude of Jacksonville, and a considerable one in longitude. Other discrepancies of the same character are noticeable. In fact there is considerable discrepancy of authority and maps as to the positions of the parallels of latitude in Florida, which should be settled. At present I am unable to decide which is right.

III.—Table of Mean Daily Range of Thermometer for each Month, Season, and the Year.

STATION.	1873.				1874.				Spring.	Summer.	Autumn.	Winter.	Year.
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.					
Jacksonville	10.9	12.	11.	13.	13.5	13.9	11.	10.	11.6	7.1	9.9	12.5	10.2
Lake City	16.	16.	13.	16.	16.	17.7	13.9	13.	14.8	10.3	13.6	15.	13.4
Punta Rassa	8.8	9.6	10.5	9.2	7.3	7.7	7.5	7.	7.	5.6	7.8	9.	6.8
Key West	6.3	5.8	5.8	5.7	6.3	9.9	6.	7.	7.6	6.6	5.7	5.9	6.4

Note.—This is not the maximum and minimum range.



IV.—Table of Mean Annual Precipitation in Rain for each Month, Season, and the Year; from observations at various points in Florida for a period of years.

STATION.	Lat.	Alt.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.	No. of yrs.	DATE.	AUTHORITY AND REMARKS.
St. Augustine	29° 18'	25	2.09	1.63	2.34	1.56	2.00	4.27	3.24	3.03	3.58	2.42	1.29	2.08	5.90	10.54	9.56	5.80	31.80	3-6	1844-46; 1851	[and incomplete.
Piattka.	29 34	25	0.93	2.04	7.16	2.47	2.86	6.54	7.35	7.00	4.33	3.78	1.60	1.42	12.49	21.49	9.71	5.00	48.69	3	1841-43	Military Post, imperfect
Fort Pierce.	27 30	25	4.45	2.72	3.01	3.55	4.27	14.28	5.16	6.81	9.27	5.36	2.21	1.59	11.13	26.25	16.18	8.76	62.98	3-3	Mar. 1852 to May 1855	Military Post.
Indian Key.	24 50	10	2.36	1.37	1.30	2.00	3.29	3.30	4.52	4.22	6.97	3.30	3.66	0.06	6.59	12.04	16.53	3.79	38.55	2	1836-37	Howe.
Key West.	24 32	10	2.86	1.38	4.21	1.55	2.58	8.29	3.35	4.95	7.79	6.38	1.18	3.13	8.34	16.60	15.35	7.37	47.65	6-6	1844-45; 1850-55	Military Post.
Fort Myers.	26 38	10	3.90	2.16	4.60	3.14	3.33	14.59	8.45	8.97	9.54	1.37	0.36	2.27	11.07	31.61	11.90	8.33	62.01	5	1851-55	"
Tampa.	28 00	20	2.20	3.01	3.37	1.95	3.24	7.04	11.10	10.10	6.23	2.40	2.00	2.83	8.56	28.24	10.63	8.04	55.47	15	1840-55	"
Fort Meade.	28 01	80	1.07	1.01	1.64	1.78	4.01	7.79	7.55	6.35	4.59	1.50	0.56	1.79	7.43	21.69	6.91	3.57	39.90	3-7	May 1851 to Nov. 1854	"
Cedar Keys.	29 07	15	2.80	5.30	1.80	1.40	0.90	6.40	4.07	11.88	4.97	8.80	2.17	2.01	4.10	22.35	11.94	10.11	48.50	2-6	July 1840 to 1842	"
Pensacola.	30 18	20	3.87	4.95	5.87	2.94	4.05	4.66	6.80	7.23	5.25	2.41	6.05	2.90	12.86	18.69	13.71	11.72	56.98	10	July 1842 to June 1855	"

Table of subsequent years, 1855, 1856, and 1857; from Surgeon-General's Report, 1860 (giving the mean).

STATION.	Lat.	Alt.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Year.	No. of yrs.	DATE.	REMARKS.
Fort Pierce.	27° 30'	25	4.54	5.25	2.97	1.58	4.48	5.82	7.05	6.49	4.58	4.09	4.37	3.23	9.04	18.20	14.00	13.12	56.23	3	1855-56-57	Not complete for 1855.
Fort Dallas.	25 55	20	5.73	1.06	4.76	2.96	7.53	5.86	9.37	4.25	6.77	7.92	2.39	2.13	15.26	18.86	16.10	8.94	60.19	3	Same.	"
Fort Myers.	26 38	10	3.59	2.72	3.83	.87	1.79	8.62	9.20	7.82	4.48	2.03	.77	2.11	6.50	25.75	7.28	8.42	47.96	3	Same.	"
Tampa.	28 00	20	3.14	2.60	2.52	.55	1.05	6.09	14.82	6.77	2.40	.60	1.69	2.29	4.05	27.77	4.38	8.04	53.10	3	Same.	One month wanting in each, 55-57.
Pensacola.	30 18	20	3.29	1.52	4.99	.55	3.28	5.19	11.51	11.64	4.37	3.00	7.75	9.02	8.82	28.35	14.61	13.88	65.62	2	1855-56	"

V.—Table of Mean Annual Precipitation in Rain for each of two years; observed at the four Signal Stations in Florida.

STATION.	POSITION OF STATION.			October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	Spring.	Summer.	Autumn.	Winter.	Year.	DATE.
	Lat.	Long.	Alt.																		
Jacksonville .	30°24'	80°40'	feet 14 }	6.37 5.50	1.71 2.52	4.81 2.52	3.86 0.82	0.50 7.31	5.20 1.70	0.56 1.55	5.36 4.63	8.41 4.44	7.75 7.48	6.21 6.80	10.67 7.07	11.12 7.90	22.37 18.72	18.75 15.09	9.17 10.65	61.41 52.36	Oct. 1872 to Sept. 1873. Oct. 1873 to Sept. 1874.
Lake City .	30 13	82 40	2800 }	5.24 0.84	1.52 3.44	3.47 2.14	5.36 0.42	1.25 6.80	6.31 1.22	2.70 4.14	5.97 2.02	9.27 6.52	5.81 3.86	5.25 0.63	3.86 4.33	14.98 7.38	20.33 10.91	10.62 8.61	10.67 9.45	56.00 36.35	Oct. 1872 to Sept. 1873. Oct. 1873 to Sept. 1874.
Punta Rassa .	27 00	82 18	5 }	2.82 1.87	0.53 2.49	1.87 1.28	6.84 1.53	0.48 2.51	1.59 0.00	3.68 0.40	9.09 1.21	5.21 6.75	5.13 6.93	9.83 4.73	9.13 4.06	14.28 1.66	20.19 18.48	12.48 8.42	9.19 5.32	54.12 33.83	Oct. 1872 to Sept. 1873. Oct. 1873 to Sept. 1874.
Key West .	24 32	81 48	10 }	2.09 0.77	0.98 0.51	0.63 2.89	3.91 2.53	0.16 0.77	0.04 0.13	2.02 1.82	1.02 0.34	3.86 4.29	4.63 4.01	3.67 4.26	6.23 5.66	3.05 2.82	12.48 16.56	9.30 6.93	4.72 6.11	29.58 31.92	Oct. 1872 to Sept. 1873. Oct. 1873 to Sept. 1874.

VI.—Table of Mean percentage of Humidity in the Atmosphere for each Month, Season, and the Year; observed at the four Signal Stations in Florida for one year.

STATION.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	Spring.	Summer.	Autumn.	Winter.	Year.
Jacksonville .	71	68	77	72	81	68	68	67	75	77	70	76	67	74	71	76	72
Lake City .	77	71	77	70	77	68	67	64	76	78	71	78	66	75	75	74	72
Punta Rassa .	74	74	76	75	78	74	71	71	73	73	76	77	72	70	75	76	73
Key West .	72	74	75	77	74	64	65	65	88	68	60	72	64	72	72	75	70

VII.—Table of Mean Barometrical Pressure for each Month, Season, and the Year, for each of two years; observed at the four Signal Stations in Florida.

STATION.	POSITION OF STATION.		Elevation of Baro. above sea-level.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	Spring.	Summer.	Autumn.	Winter.	Year.	DATE.
	Lat.	Long.																			
Jacksonville .	30°24'	80°40'	22 9	30.07 29.92	30.15 30.07	30.23 30.16	30.13 30.16	30.12 30.12	30.18 30.06	30.05 30.07	29.98 29.96	30.03 30.04	30.09 30.06	30.07 30.02	30.02 30.01	30.07 30.03	30.06 30.04	30.08 30.00	30.16 30.11	30.09 30.06	1872-73. 1873-74.
Lake City .	30 13	82 40	216	30.04 30.08	30.23 30.08	30.18 30.21	30.09 30.21	30.10 30.12	30.17 30.05	30.03 29.97	29.96 30.00	30.03 30.02	30.09 30.05	30.07 30.01	30.02 30.01	30.05 30.00	30.06 30.02	30.09 30.05	30.09 30.08	30.07 30.06	1872-73. 1873-74.
Punta Rassa .	27 00	82 18	17	30.01 28.97	30.09 30.10	30.16 30.15	30.10 30.17	30.15 30.14	30.19 30.08	30.07 30.04	29.99 30.02	30.06 30.06	30.10 30.04	30.08 29.66	30.00 30.00	30.08 30.04	30.08 29.92	30.03 29.69	30.13 30.12	30.10 29.94	1872-73. 1873-74.
Key West .	24 32	81 48	17	29.95 30.00	30.03 30.07	30.13 30.11	30.07 30.13	30.12 30.09	30.15 30.06	30.04 30.07	29.97 29.99	30.04 30.04	30.07 30.06	30.05 29.97	29.98 29.98	30.03 30.04	30.05 30.01	29.97 30.01	30.10 30.11	30.04 30.04	1872-73. 1873-74.



VIII.—Table of Winds, with Direction thereof, for each Month, Season, and the Year; observed at the four Signal Stations in Florida; also mean daily velocity for one year.

STATION.	Direction of wind.	1873.				1874.												Spring.	Summer.	Autumn.	Winter.	Year.	Mean daily velocity of wind for each month, miles per hour.	No of cloudy days.								
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.																			
Jacksonville	N.	5	6	8	9	6	1	3	2	1	0	0	6	6	1	17	23	47	October	7	6											
	N.W.	4	1	4	8	1	2	3	0	1	1	0	0	0	5	5	8	20	November	6	10											
	W.	3	9	3	3	1	4	0	1	0	0	0	2	5	0	14	7	26	December	7	6											
	S.W.	0	4	3	4	2	8	7	2	6	3	6	0	17	15	4	9	45	January	6	7											
	S.	1	2	2	1	3	7	6	4	8	8	4	4	17	20	7	6	50	February	7	6											
	S.E.	1	1	2	3	3	3	6	1	8	4	2	1	10	14	3	8	35	March	8	6											
	E.	1	1	0	2	1	0	2	7	4	9	4	11	9	17	13	3	42	April	7	6											
	N.E.	14	4	7	5	8	6	2	7	2	6	15	6	15	23	24	20	82	May	8	6											
	Variable.	0	2	1	1	3	0	1	7	0	0	0	0	8	0	2	5	15	June	6	6											
	Calm.	2	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	3	July	6	6											
																			August	6	6											
																			September	6	6											
Lake City	N.	6	4	5	3	4	2	2	4	0	0	0	6	8	0	16	12	36	October	5	4											
	N.W.	1	8	0	1	4	4	3	1	0	2	0	0	8	2	9	5	24	November	4	4											
	W.	2	4	4	3	1	2	1	2	2	0	1	3	5	3	9	8	25	December	5	5											
	S.W.	2	3	5	5	6	13	9	8	9	3	10	0	30	22	5	16	73	January	5	5											
	S.	1	0	1	0	3	3	5	1	5	8	0	6	9	13	7	4	33	February	5	5											
	S.E.	1	2	1	4	2	1	4	0	6	8	3	0	5	17	3	7	32	March	6	6											
	E.	6	3	6	4	3	2	3	8	5	3	4	6	13	12	15	13	53	April	5	5											
	N.E.	11	6	6	11	3	5	1	3	3	7	13	9	9	23	24	20	75	May	4	4											
	Variable.	0	0	3	0	2	0	2	3	0	0	0	0	5	0	0	5	10	June	4	4											
	Calm.	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	July	4	4											
																			August	4	4											
																			September	5	5											

=128

=120

Table of Winds, etc.—Continued.

STATION.	Direction of wind.	1873.			1874									Spring.	Summer.	Autumn.	Winter.	Year.	Mean daily velocity of wind for each month.	No. of cloudy days.	
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.								
Key West	N.	4	6	6	4	1	1	4	3	1	1	3	2	8	5	12	11	36	October	5	
	N.W.	1	5	2	2	2	5	2	1	3	3	4	1	8	10	7	8	31	November	11	
	W.	1	1	2	0	0	5	2	5	3	3	2	2	12	8	4	2	26	December	12½	
	S.W.	1	1	1	1	4	5	2	2	5	4	5	0	9	14	2	6	31	January	9	
	S.	0	1	1	1	3	3	6	2	2	5	0	0	11	7	1	5	24	February	14	
	S.E.	1	1	2	3	5	6	2	0	4	4	0	0	8	8	2	10	28	March	10	
	E.	9	4	8	3	5	3	7	6	8	5	5	20	16	18	33	16	83	April	8	
	N.E.	11	7	6	13	3	2	1	6	4	6	9	5	16	19	23	22	80	May	5	
	Variable.	0	3	1	3	5	1	4	6	0	0	0	0	11	0	3	9	23	June	9	
	Calm.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	July	14	
	N.	7	4	6	3	3	1	1	4	0	2	0	1	6	2	12	12	32	August	8	
	N.W.	3	3	2	3	1	4	4	2	1	4	6	2	10	11	8	6	35	September	15	
	W.	1	4	1	0	0	1	1	1	0	0	2	1	3	2	3	1	8	October	12	
	S.W.	0	2	2	1	4	0	0	1	0	3	3	2	1	6	4	5	16	November	13	
Punta Rasa	S.	0	1	0	0	0	0	1	0	1	3	0	1	1	4	2	0	7	December	11	
	S.E.	0	0	1	0	4	8	3	3	9	1	8	4	14	18	4	5	41	January	7	
	E.	6	5	5	5	11	12	16	9	17	14	6	12	37	37	23	21	118	February	8	
	N.E.	11	10	11	18	4	3	3	5	2	4	7	6	11	13	27	33	84	March	10	
	Variable.	0	3	0	0	1	0	1	4	0	0	0	0	2	4	0	3	9	April	6	
	Calm.	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	0	4	May	6	
	N.	7	4	6	3	3	1	1	4	0	2	0	1	6	2	12	12	32	June	8	

= 125

= 146

From the first table of mean temperature, supplied originally by the Surgeon General's Office, that excellent writer on the Climatology of the United States, Lorin Blodget, has indicated the following isothermal lines for Florida:—

The spring isothermal of  $70^{\circ}$ , enters a little south of St. Augustine, and inclining north as the more elevated portion of the State is reached, rises above the thirtieth degree of latitude, and again declining south towards the Gulf, follows the thirtieth parallel of latitude along the Gulf coast of Middle Florida. The spring isothermal of  $75^{\circ}$  crosses the peninsula below the 27th degree of latitude, and has a considerable northward curve.

The summer isothermals of  $81^{\circ}$  strike each of the peninsula coasts between the 27th and 28th degrees of latitude, and respectively follow the coast-lines. Those of  $82^{\circ}$  traverse the interior of the peninsula, the one on the east side of the centre pursuing its course into Georgia, while that on the west side runs through Middle and West Florida. These summer isothermal lines follow the length of the peninsula, and consequently in it have a north-west and southeast direction.

For autumn the isothermal of  $70^{\circ}$  enters on the 30th parallel of latitude, and curving a little south as the more elevated region is reached, rises again even north of that parallel near the Gulf, and follows the coast of Middle and West Florida. That of  $75^{\circ}$  crosses the peninsula between the 27th and 28th degrees of latitude, passing out on the Gulf side a little south of its opposite point of entrance. The lowest position of an isothermal of  $72^{\circ}$  for the same season is indicated as crossing the peninsula between the 28th and 29th degrees of latitude. This has also a little southerly curve as it crosses the middle and western slope of the peninsula.

For winter the isothermal of  $55^{\circ}$  enters the State a little north of the 30th parallel of latitude, and curving southward in the elevated region, again rises northward near the Gulf coast, which it follows through Middle and West Florida. That of  $60^{\circ}$  crosses the peninsula near the 29th degree of latitude. The lowest position of isothermal of  $62^{\circ}$  is indicated as crossing the peninsula a little south of the 28th parallel of latitude. The isothermal of  $65^{\circ}$  crosses the peninsula between the 26th and 27th degrees of latitude. A minimum isothermal of  $50^{\circ}$  is also indicated as beginning at New Smyrna, descending southwest to the centre of the peninsula, and thence running west to Tampa. Between the points of entrance on the Atlantic and of exit on the Gulf of this mini-



mum isothermal, there is a difference of three-fourths of a degree of latitude. While this isothermal is only occasional and not constant for the season, its great southerly deflection can only be explained by the greater altitude and drier atmosphere of the centre and western slope of the peninsula. To the same causes is to be also attributed the southerly curves of the winter isothermals in crossing the central ridge of the peninsula, and their exit on the Gulf side a little south of their opposite points of entrance.

The isothermal of  $70^{\circ}$ , as the mean temperature for the year, crosses the peninsula about the 29th degree of latitude; and that of  $75^{\circ}$  a little south of the 27th degree of latitude. The lowest position of an isothermal of  $72^{\circ}$  is indicated as crossing the peninsula about the 28th degree of latitude.<sup>1</sup>

Exposed as Florida is on the east to the Atlantic and on the south and west to the Gulf of Mexico, and having a large area of level country on the north, her climate, owing to frequent changes in the direction of the wind, may be considered rather variable during winter and spring as regards transitions of temperature. During March, 1873, the minimum temperature at Punta Rassa was  $38^{\circ}$ , a degree of cold sufficient for light frost in interior elevated districts. At the same place in December, 1872, the minimum was  $35^{\circ}$ , which may be considered as fully representing a light frost in the interior. A temperature of freezing,  $32^{\circ}$  for March has occasionally occurred at Tampa, and light frosts for the same month are almost an annual occurrence. The average minimum temperature at Tampa for winter for a period of twelve years is  $34^{\circ}.4$ ; though the thermometer may some winters fall even below  $30^{\circ}$ . It was down to  $30^{\circ}$  in 1843, 1849, and 1852. In 1857 the thermometer fell to  $26^{\circ}$  at Tampa,  $32^{\circ}$  at Fort Myers,  $29^{\circ}$  at Fort Pierce on Indian River, and to  $30^{\circ}$  at Fort Dallas on the Miami.<sup>2</sup> It is highly probable that such a depression has been reached several times since. In 1835 the thermometer, it is said, fell at Fort King (near Beala) one degree north of Tampa, to  $11^{\circ}$ , or  $21^{\circ}$  below freezing. At the same time it is reported to have fallen  $7^{\circ}$  below zero in the latitude of St. Augustine, and that "all kinds of fruit trees were killed in the ground and extensive orange groves destroyed."

Now, when it is remembered that the difference in the latitude

<sup>1</sup> See Blodget's Isothermal Charts.

<sup>2</sup> Meteorological Register of Surgeon General's Report, 1860.

of the two places does not amount to a degree, it is impossible to credit the statement and believe that there was between the two places a difference in temperature of  $18^{\circ}$ . Besides there is no authority for it outside of historical tradition. Assistant Surgeon R. F. Simpson, writing from Fort Dallas in April, 1857, says: "There was frost and ice on December 25 and 26, 1856, and January 20, 1857, with the thermometer at  $30^{\circ}$  at sunrise." Remembering that Fort Dallas is low down on the eastern coast of the peninsula, below the 26th degree of latitude, it becomes very questionable whether there is any part of the peninsula universally exempt from frost, though still of not sufficient intensity to materially affect tropical plants. So far as I know, there are no records for the same year (1857) in the upper eastern part of the State; but at Mount Vernon Arsenal, near the Florida and Alabama line, in latitude  $31^{\circ}12'$  with 200 feet altitude, the minimum was  $10^{\circ}$ , or  $22^{\circ}$  below freezing. This difference of  $20^{\circ}$  of temperature between Fort Dallas and Mount Vernon Arsenal would only give about  $3^{\circ}$  difference of temperature for each degree of latitude. Now, remembering that the winter of 1856-57 was the coldest of which we have any record—although the observations at Tampa embrace twenty-seven years—we are compelled to discredit the excessive degree of cold for St. Augustine in 1835. Nevertheless these facts go to demonstrate pretty conclusively that during some winters a considerable degree of cold, as compared with the mean winter temperature, is experienced in every section of the State, though occurring at rather irregular and mostly long intervals of several years. Such depressions are never of such intensity south of the 29th degree of latitude as to jeopardize bearing sweet orange trees, though sometimes fatal to those of only a few years' growth, and such perennial tropical plants as the banana, pine-apple, etc. In these unusual depressions, however, the climate forms no exception, as the same thing does occur in the milder temperate latitudes of the Eastern Hemisphere.

The maximum temperature of summer generally ranges from  $92^{\circ}$  to  $95^{\circ}$ , rarely exceeding the latter except in the northern part of the State. This fact is so contrary to the impression generally entertained by the public outside of the State, that to many the statement appears at first incredible. It need not appear so strange, however, when it is remembered that in the north temperate zone, the days are longer and the nights shorter during summer as we advance from the lower to the higher latitudes, and that

consequently the rays of heat from the sun are longer concentrated on the earth's surface with a proportionately shorter night for cooling by radiation. The reverse being the case in the winter, it is thus that an equal distribution of heat for the year in the lower and higher latitudes of the same zone is insured, the winter deficiency being compensated by the summer excess.

The regular alternation of the land and sea breezes, the latter being the cooler by several degrees, greatly ameliorates also the summer heats of Florida, and markedly so all along her extensive coast. In corroboration of these statements I quote from Surgeon-General Lawson, who says:—

“The climate of Florida is remarkably equable and proverbially agreeable, being subject to fewer atmospheric variations, and its thermometric ranges much less than any other part of the United States, except a portion of the coast of California.

“For example, the winter at Fort Snelling, Minnesota Territory, is 48° colder than at Fort Brooke (Tampa), but the summer at Fort Brooke is only about 8° warmer. The mean annual temperature of Augusta, Georgia, is nearly 8°, and at Fort Gibson, Arkansas, upwards of 10° lower than at Tampa, yet in both those places the mean *summer* temperature is higher than at Tampa. In the summer season, the mercury rises higher in every other part of the United States, and even in Canada, than it does along the coast of Florida. This is positively shown by meteorological statistics on my file in this bureau. At Portland, and on the coast of New England, the thermometer attains an average height in summer of 94° Fahrenheit, and in winter descends to —7°, having an annual range of 101°. At Fort Mifflin, near Philadelphia, the thermometer has an annual range of 87°, rising to 95° Fahrenheit in summer, and falling to 8° in winter. At Fort Moultrie, Charleston harbor, the average range is 70°, being in summer 90°, and in winter 20°. At Fort Pierce (or Capron), Indian River, Florida, the range is 59°, the annual range averaging for its highest point 94°, and the lowest 35°. At Tampa, the annual range is 58°, being 92° in summer, and 34° in winter; while at Key West the annual average range is only 35°, being for summer 89°, and 54° for winter. If we were to extend our comparison by including the stations in the interior of the United States, remote from the influences of the sea-breezes, the difference would be still more apparent. The point under consideration will, however, be illustrated sufficiently by comparing the temperature of Florida, as



above given, with that of portions of Texas lying within the same parallels of latitude. At Fort Brown, near the mouth of the Rio Grande, and where the summer heats are much modified by the strong coast-breezes, the mean annual range is  $67^{\circ}$ , or from  $95^{\circ}$  in summer to  $28^{\circ}$  in winter. In the interior of Texas, the range is very great, the summer heats rising to a mean of  $112^{\circ}$  in the valley of the Rio Grande at Laredo (Fort McIntosh), and to  $103^{\circ}$  at the posts on the upper plains. It falls to a mean of  $20^{\circ}$  in winter on the Rio Grande valley, and to  $10^{\circ}$  on the plains, making the range near  $92^{\circ}$  in each case. At Fort Smith, Arkansas, the range is  $108^{\circ}$  having the summer temperature of  $103^{\circ}$ , and the winter of  $-5^{\circ}$ ."

The above extract was written in October, 1855, and may be taken as a fair comparison of the temperature of Florida with that of other sections of the United States.

The table of daily mean range of temperature for each month, for the year beginning October, 1873, and ending September, 1874, calculated from the daily bulletins of the Signal Office, show it to be comparatively small. For the seasons, the greatest range is in the winter and spring. The daily range diminishes as the peninsula is descended, and at Key West there is but little difference for all seasons, while the daily range is small.

Another element in a climatological consideration is humidity of the atmosphere, and the amount of rain-fall. As to the rain-fall, its mode of precipitation—whether rapidly or slowly—is also important as materially affecting the state of the weather. Regarding the humidity of the atmosphere, the amount of data I possess—only for one year (see table)—is too insignificant, and the positions of the few signal stations too unlike and peculiar individually, to allow of any attempt at generalization. Yet their general tendency is to correct an erroneous impression entertained even by some physicians in the northern parts of the State, and by the public generally, to wit, that there is greater humidity for the winter the lower the peninsula is descended. The table of mean monthly percentage of relative humidity gives pretty nearly the same for all four of the signal stations. But it must be remembered, as previously intimated, that that for Punta Rassa—from its littoral position—cannot be considered as fairly representing the interior of the peninsula, from the greater humidity of the atmosphere always present on the coast. While there is no great variation from the annual mean for any season, yet spring shows the least percentage. The rela-

tiye percentage of humidity is, however, not in excess of that of the Atlantic States, nor of California during winter as observed at San Francisco and San Diego, so far as a cursory examination enables me to judge. The saline impregnation of this moisture, arising from the Atlantic and Gulf, doubtless imparts to it also antiseptic and salubrious properties.

The rain-fall in Florida is not characterized by uniformity as to amount for different years and same seasons, nor as regards sections and localities. This is particularly noted on examining the tables for separate years of the meteorological register embodied in the Surgeon General's reports, published in 1856, 1860. This variation from the mean is greater in excess than deficiency. For instance, the mean at Tampa is 55 inches. In 1840 the rain-fall at this place was 89 inches, and in 1854, 69 inches, yet the minimum rain-fall has never been below 40 inches during the same period of observation. Again, at Pensacola in 1855 it amounted to 77 inches. The exposed position of St. Augustine immediately on the Atlantic, accounts to some extent for the smaller average rain-fall at that place as compared with other points in the State. The same applies to Punta Rassa as a signal station, though hardly with equal force, as the latter is not quite so exposed to the open sea. The well-known fact that there is less rain on the coast than in the interior is a sufficient explanation. The rain is not equally distributed through the year, but is so excessive in the summer as to specially denominate that the rainy season. According to Loomis' meteorology, Alabama, Louisiana, and Oregon exceed Florida in the annual amount of rain-fall; while Virginia, the Carolinas, Tennessee, and Kentucky equal her. By this author, the annual mean rain-fall for the whole State is put at 48 inches, which is in conformity with observations so far made. As to the distribution of rain throughout the year the same author says:—

“Throughout most of the United States east of the Rocky Mountains, the rain is pretty equally distributed through the different months of the year, but the rain of summer is everywhere somewhat greater than the rain of winter, including the melted snow. In New England, the difference between the rain for these two seasons is less than 10 per cent.; in the State of New York it is nearly 50 per cent.; in Virginia and the Carolinas it is 100 per cent.; in Florida it is 200 per cent.; in Texas it is 75 per cent.; in Ohio it is 25 per cent.; in Michigan and Wisconsin it is 140 per cent.; while in Iowa and Kansas it is 300 per cent.; that is, the fall of

rain in summer is four times as great as it is in winter. On the Pacific coast, this law is reversed. In California, the rain of winter is more than twenty times as great as that of summer, and in Oregon, it is seven times as great."

From this estimate it is seen that the summer rain in Florida is three times more than that of winter. This, taken in connection with the mean annual rain-fall of the Atlantic Gulf States and the winter rain-fall of the Pacific States, demonstrates the winter climate of Florida to be a comparatively dry one, especially that of the peninsula. As nearly all the posts where meteorological observations were made are on the peninsula, it is presumable that this estimate more fully represents that section than it does the northern portions of the State. It is only the peninsular portion of the State that has a climate of its own markedly different and distinct from that of the northern portions of the State, which possess no distinctive features from similar sections, contiguous to the coast, of the other Gulf States. The winter climate of the peninsula is dry, and this dryness becomes more marked as the peninsula is descended. Blodget, in his *Climatology of the United States*, says:—

"By reference to the general tables it will be seen that there is a marked tendency toward the development of a winter dry season even in the States next to Florida, and that in southern Florida this is quite decided and almost as fully developed as in the recognized tropical climates. As before remarked, however, there are great irregularities, and often quite contradictory results for single years. . . . The most prominent feature of rain distribution in Florida, in distinction from other parts of the United States, is this great irregularity, which prevents us from getting clear general views from periods embracing but two or three, or a few years. . . . The first approach of this dry season is made in October, and from the minimum, which appears to occur in November, there is a partial resumption of the rains apparent in mid-winter, to be followed by other months of less rain. But as a whole, the winter from October forward is a dry season on the peninsula of Florida. It appears to be a climate ordinarily of a division into two principal seasons in regard to the rains, the wet summer and the dry winter, yet either may be interrupted by the extremes of an opposite character much greater than those occurring in any other known district. . . .

"Beyond the plains the characteristic features of the districts of



periodical rains are strikingly exhibited, and Southern Florida gives strong evidence that it should be identified with the districts of periodical rains rather than with the area of constant precipitation of the Eastern United States. . . . From the Gulf coast northward there is also a decided increase of annual precipitation at some points, and for a moderate distance; as also from the coast of St. Augustine, Florida, northwestward towards the interior of Georgia. . . . The south of Florida alone gives as soft a climate for the winter as that of the south coasts of the Mediterranean, and at a point far enough south to do so, the tropical features of a dry winter and rainy summer become instituted. At Tampa the average temperatures are nearly those of Cairo, Egypt, and the difference of latitude two degrees."

The winter dry season in the Florida peninsula is generally extended into the latter part of May or first of June. Another distinctive feature of the peninsula climate in connection with the rains of winter—and this I wish particularly to emphasize as being the case on the Gulf side—is that they generally assume the character of showers, and are not diffused over several consecutive days, in a light but constant rain, as is the case in the northern sections of the State, and in the Southern Atlantic and Gulf States generally. As a natural consequence the number of wholly cloudy days in the peninsula is much less also. Fogs are also comparatively rare, especially on the Gulf side of the peninsula, as compared with other sections of the State. The absence of fogs becomes more marked during all seasons as the peninsula is descended.

The frequency of dense and persistent fogs on the Atlantic and along the St. John's is doubtless dependent on the reduction of the atmospheric temperature on that side by the shoaling of the Arctic under current. The U.S. coast surveys, as well as the deep sea soundings of a late date of H. B. M. ship Challenger, have conclusively determined the returning deep Arctic current, the counter-movement of the Gulf Stream, obtaining in its course towards the equator a westward tendency from the rotation with increased diameter of the earth, shoals up on the eastern coast of Florida. The result must necessarily be to lower the temperature of the superjacent atmosphere, and the latter coming in contact with the excessive humidity naturally afforded by a low level section of country, with its abundance of still and sluggish waters, could hardly fail in producing fogs and rain. This also accounts,

no doubt, for the number of rainy days on the eastern side of the peninsula being much larger than on the Gulf side, as is clearly shown by the registry of the weather embodied in the Surgeon General's Report for 1860. Besides, the more elevated and rather hilly nature of the middle and western slope of the peninsula, rendering the soil naturally drier, may also have some effect in rendering the climate of these sections less subject to excessive humidity.

The table of winds shows how many days the wind was from one of the cardinal points of the compass, and its monthly mean rate of velocity for one year. The winds are generally very changeable, except very low down on the peninsula, which is slightly within the belt of the trade-winds. The upper two thirds of the peninsula constitute the calm belt, or that which has no regular movement with either the westerly or trade-winds.

By reference to the table it will be seen that the range of barometrical pressure, at the four signal stations, for two years, is very inconsiderable; and that there is but little difference in the yearly mean for the several stations. September has a low pressure for Punta Rassa and Key West, while May has the lowest pressure at all the different stations. Storms and such like are not more common in Florida than in the other Southern States. Most of the storms originating in the Gulf follow the Gulf stream, and consequently their outer circles only reach the peninsula, seldom amounting to much.

Lightning with thunder is quite common in the summer season. The variety known as *zigzag* is the most common kind; very little *ball* or *sheet* lightning; while *heat* lightning in the early part of the night may be observed for a short time preceding the commencement of the summer rains. As to the electrical tension of the atmosphere, I have no observations to offer.

So far as my observations extend, tests for ozone give positive results for all seasons.

When the climate of Florida is compared with that of any of the United States its superiority becomes apparent. As to dryness of winter climate the peninsula compares favorably with California, the rain fall for this season being about the same. It is only the winter isothermal of  $55^{\circ}$  which traverses Northern Florida and Lower California. The winter isothermal of  $65^{\circ}$  crossing the peninsula does not even appear in Texas on the lower Rio Grande. If compared to the drier ones of Arizona, New Mexico, and the lower

Rio Grande, we find in the latter a greater thermometric range, a less equable temperature with a lower mean, and much greater summer heat. And considering the nature of the soil of these western dry sections, it is evident that this arid condition of their atmosphere must, of itself, be a very serious drawback. The soil being sandy, and in many places alkaline, cannot fail to charge the air with fine particles of dust, which would prove more or less injurious to the lungs.

Assistant Surgeon P. F. Harvey, writing of the climate of the lower Rio Grande (*N. Y. Medical Record*, vol. x. No. 2), says:—

“Several cases of consumption came under my observation. Two were instances of invalids seeking a climate which they thought would be beneficial to them. Both the latter were rapidly fatal. Six cases were local, and two of them terminated fatally during my stay. These facts, and others relative to the climate of which I speak, convince me that it is not adapted to a phthisical patient, or to one so inclined. In fact I regard it as one of the most unfavorable portions of our country as a sanitarium for consumptives, or even for the weakly and delicate persons who seek a mild and genial place of resort for the winter season. Another circumstance which militates against the adoption of this climate by consumptives during the winter, is its variability. Sudden changes from an enervating heat to a temperature nearly, or quite, as low as the freezing point, take place frequently during the winter months. In my experience, a fall of 40° inside of twelve hours was not an unusual occurrence. Stray winds were frequent throughout the year, and during their prevalence the atmosphere was so charged with fine particles of sand as to be extremely irritating to susceptible lungs. There is little doubt in my mind that this climate has the effect of hastening tubercular deposit, or caseiform infiltration, in persons of a phthisical habit, if not of actually developing consumption *de novo*.”

These remarks, no doubt, apply with equal pertinency to Arizona and New Mexico. It is, moreover, highly probable that the breathing of an atmosphere charged with fine particles of sand would, in the course of a few years, produce chalicosis pulmonum in previously healthy lungs. “Meinel found 18.2 per cent. of sand in the lungs of a railroad station-master who was stationed in an extremely sandy region. Chalicosis does not differ in its general course materially from other forms of pneumokoniosis. It is said that the sputa now and then contain stony concretions.



The anatomical features also resemble, in the main, those observed in siderosis. . . . The same bronchitic and peri-bronchitic processes occur together with the caseous deposits, cavities, and the final eruption of tubercles."

NOTE.—At the meeting of the State Medical Association in Jacksonville, Fla., last February, Dr. A. S. Baldwin of that city read an interesting paper on Climatology, with some reference to that of Florida. Just from hearing the paper read, the impression made on my mind was that it did not specially, but only incidentally, treat of the climate of Florida. Nevertheless it contained much valuable information relative to the latter, and not the least was the Dr.'s own long-continued observation, at Jacksonville—which, had circumstances enabled me to have had recourse to it, would doubtless have been of great benefit in preparing this paper.

SANITARY.—As to the salubrity of the climate of Florida—in the absence of anything like a registration law, or any form of mortuary reports—the only statistics to be depended on, as to percentage of sickness and mortality, are those of the troops in Florida during the long Seminole disturbances. In a letter to an eminent citizen of Florida (Hon. D. L. Yulee), the Surgeon General himself very ably treated the subject of the health of Florida, giving statistics, and comparing it with other sections of the United States. While this more particularly relates to the peninsula, yet I trust I will be excused for quoting it at some length. The Surgeon General (1855) says:—

"Florida, washed on the east side by the Atlantic, and on the west and southwest by the waters of the Gulf, daily fanned by the breezes from the sea which are wafted over the whole face of the country and with an atmosphere of equable temperature through winter and through summer, its climate cannot be more unfriendly to the health of man than that of the adjacent States, which present but one side or a small portion of their territory to the Ocean. Florida may have more lakes on its surface, a few more rivers and rivulets, and a greater extent of swamp perhaps than the other States, but the exhalations from these sources are evidently modified and mollified by the universally pervading sea atmosphere, and must consequently be less destructive to human life than malaria which is eliminated by the swamps and bottom lands of Louisiana, Alabama, Georgia, and South Carolina, or by the banks of the watercourses even of other more northern sections of country.

"I have served in Florida and participated with the troops in the privations and the toils of the field, and I have also served with

an army on the northern frontier, and from my experience of the influence of climate and of active operations in the field upon the health of soldiers, I have no hesitation in expressing the belief that had the troops who were employed in the Florida war been engaged for the same length of time in active operations in winter and summer on the frontiers of Canada, though the *cases of indisposition* might have been less numerous, the *mortality* would have been infinitely greater than was experienced in Florida. The general healthfulness of many parts of Florida, particularly on its coasts, are proverbial. The average annual mortality of the whole peninsula, derived from returns in this office, is found to be 2.6 per cent., while of the other portions of the United States (previous to the war with Mexico) it is 3.5. The annual average of fevers of malarial origin in some parts of the State is very high, and in others very low, making a general average of about fifty-eight per cent. The general average of fatal cases during the Seminole war, and previously, were from enteric disorders, to which troops were more liable than persons in civil life. The higher rates of sickness, in general, among troops in the field than among civilians is more attributable to their constant and severe duties and greater exposure to morbid influences, than to peculiarities of climate.

"As the data from which the conclusions herein set forth are taken from military records, we must consequently make due allowance for the fact that the ratio of *cases under treatment* among troops and among citizens, is higher in the former than the latter case. And this may be accounted for in a great measure by the fact, that among the working classes of middle life, those cases only are recorded and enter into statistical data, which interfere with or prohibit manual labor, whereas among soldiers the slightest cases of indisposition are reported. In the latter case an admission on the sick list secures an exemption from labor, while in the former it occasions a loss of wages.

"Let us now compare the number of cases annually treated in Florida with cases under treatment at other sections of country, as furnished by the army records, and we find the following ratio: Along the region of the northern lakes, the number of cases under treatment was 200 per cent., the mortality being 0.9 per cent., along the coast of New England nearly the same percentage of cases under treatment (191), and the mortality 1.5 per cent.; through the interior of our country (those points north of latitude 39°, and distant from the lakes or Atlantic, *e. g.*, the northeast line

of Maine, the interior of New York, Pennsylvania, Iowa, Missouri, the northern part, Wisconsin and Minnesota), we find the percentage of cases annually treated a little over 300, with a mortality of 0.8 per cent. Again, along the Atlantic coast from New Jersey to Georgia, the number treated is not quite as high as the last, being about 289 per cent., with a mortality of three per cent. In the Southwestern States, the lower part of Missouri, Arkansas, West Tennessee, Mississippi, the Red River country, and Indian Territories south of latitude  $36^{\circ}$ , it is very large, being 350 per cent., while the mortality is 3.6 per cent. In the territory adjacent to the Lower Mississippi, it is reduced to 286 per cent. of cases treated (except, perhaps, when visited by unusually severe epidemics, as in late years), with the mortality of 4.4 per cent., while in Florida the average of cases annually treated is 246 per cent., and the mortality, as before shown, is 2.6 per cent. While, therefore, the ratio of mortality among the troops in the northern part of the United States is less than in Florida; on the other hand, the average mortality in Florida is less than in other sections of the Southern and Southwestern States; which, in fact, are the proper points of comparison, on account of similarity of diseases and geographical position.

"To illustrate the actual and comparative sickness and mortality of the peninsula of Florida, we may take as points of comparison three posts, one established on the Atlantic coast (Fort Marion, St. Augustine), one in the interior (Fort King, near Ocala), and a third on the Gulf coast (Fort Brooke, Tampa), and we find that at Fort Marion the average annual mortality for a period of eleven years (from 182 to 1834 inclusive) is 2.36 per cent. In some of these years (1829, 1832, and 1833) no deaths were reported. The highest mortality for any single year was (in 1828) 7.01 per cent.; the lowest was (in 1825) 0.91 per cent.

"At *Fort Brooke* we have the annual average mortality for a period of nine years 1.01 per cent. The highest being (in 1830) 3.44 per cent., and the lowest (1824) 0.96. In three of the years (1827, 1831, and 1832) no deaths were reported.

"At *Fort King* we have returns for only a few years embraced in the periods above given. The average annual mortality, however, for three years (1827 to 1829 inclusive) is 1.19 per cent. In 1829 no deaths were reported. The highest mortality (in 1828) was 2.04 per cent; the lowest (in 1827) 1.63 per cent."

The above clearly demonstrates the superior salubrity of the



Florida peninsula as compared with the other Southern and South-western States. And when we consider the exposure to the sun and rain, the fatigues of scouting through hammocks, swamps, and everglades, together with the often unhealthy positions of military posts or temporary camps—inseparable from an Indian warfare—we naturally feel surprised at the low percentage of sickness and mortality among the troops in Florida as compared with other sections of the country where, in most instances, the troops were better quartered, and less fatiguing duties imposed. According to the medical statistics of the army, the most common diseases among the troops in Florida were malarial fevers and bowel affections.

The only other statistical data, which I can offer in this connection, are those of the State prison at Chattahoochee, supplied by the prison warden in his annual report for 1874. The whole number of convicts for the year was 150; the highest number at any one time 89, and the smallest 54. The attending physician in his report to the warden says that he had treated 1500 cases during the year; and an unlimited number applied who were not prescribed for. "Intermittent fever, remittent fever, rheumatism, dysentery, diarrhœa, and catarrhal fever were the principal cases treated." Two deaths are reported. 1500 cases of sickness to 150 subjects certainly indicates an extraordinary percentage of sickness. And, whether or not it legitimately represents the section of the State in which the prison is located, or is dependent on a bad sanitary condition of the prison, I do not know. The attempted explanation of the attending physician is in the following ambiguous language: "Most of the cases have originated in impaired constitutions, more or less permanently debilitated from habits of vice and intemperance, which the slightest exposure brings into active existence, resulting in a long catalogue of diseases, which causes a heavy expense to the State." What is brought "into active existence" is not very clear.

The following extracts, from the *Florida Settler*, a pamphlet issued by the State Commissioner of Immigration, indicate the classes of diseases most common in the northern sections of the State. They give no idea, however, as to the actual amount of sickness and mortality.

Dr. J. H. Randolph, of Tallahassee, says: "The diseases of Middle Florida are few, and possess little variety. In the spring, from sudden variations of temperature, from want of adaptation

of clothing, and from imprudence in diet, diarrhoea prevails, and sometimes sporadic cases of dysentery occur. In the summers, bilious remittent fevers, usually of a mild type, show themselves; and in the fall intermittents, with occasionally a case of the much dreaded 'congestive chill.'" These diseases are very amenable to medical treatment, and are rarely fatal. The ratio of mortality is unusually low, and a remarkable exemption exists from all epidemic and contagious diseases. Another writer, in the same county, says: . . . . "We have intermittent and remittent fevers in summer and fall, and pneumonia and rheumatism afflict those who are exposed to the inclemencies of the weather in winter and spring."

A gentleman, writing from Madison County, says: "Chills and fever and light bilious attacks are common, but typhoid and congestive, typhoid with pneumonia, and other fatal diseases, are not prevalent here, though we are not entirely exempt from them."

Dr. W. S. Rice, of Hamilton County, says: "Our principal diseases are fever and ague, and remitting or bilious fever. Some years they prevail almost all over the county, but again we have a very light sprinkling of them. . . . . Once or twice I have seen pneumonia to prevail endemically."

Hæmaturia has also become a frequent complication in the malarial fevers in the northern part of the State, and even as low down on the peninsula as Marion County.

Throughout all the interior of Florida, malarial fevers are generally common, though occasionally localities are found quite exempt. The coast, as a rule, is entirely free from this class of fevers. From my own personal knowledge and observation, much less malarial fevers now prevail in the counties of Hernando and Hillsborough than formerly; and I am assured by Dr. Butts, of Beala, that the same is the fact as regards Marion County.

Dr. J. A. Williams, of Alachua, writes me that certain sections of that county are quite exempt from malarial fevers, while contiguous sections may be quite sickly.

So many other affections appear to be dependent, as it were, upon the susceptibility engendered by the malarial cachexia, that it may be regarded as decidedly healthy wherever experience determines the absence of malaria.

While it is my opinion that Florida is probably the most healthy of the Southern States, yet I think it is a weak enthusiasm to conclude that Florida is the healthiest country on the face of the wide

world. It would be strange, indeed, if her fertile swamps and hammocks did not generate fevers. It has been proved, however, that on her salubrious sea-coast almost immunity from fever may be enjoyed; and it is high praise to say that, if the bane exists, a way of escape is within easy reach of those who select Florida for a home.











